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PEER-REVIEWED JOURNAL ON THE INTERNET

Digital capital and online activities: An empirical analysis of the second level of digital divide

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Abstract

This paper explores inequalities in using the Internet by investigating several digital activities that require different levels of digital capital. Data collected in the U.K. through an online survey of a national representative sample (868 respondents) shows that levels of digital capital and type and quality of online activities are intertwined. The analysis shows that digital capital, conceived and measured as a specific capital, is entangled with the frequency/intensity of social, economic/financial means, ordinary/daily entertainment, and political activities, but not with learning-related activities. This work contributes to the literature in both empirical and theoretical terms by testing the reliability of digital capital and expanding its use to investigate digital inequalities. From a policy-making point of view, the awareness of citizens' level of digital capital may help tailor initiatives to support citizens in using ICTs on a wide array of fields, such as job seeking, sociability, savings, familial relationships, and several online activities. Finally, this paper highlights that digital inequalities cannot be tackled by considering access and competence separately. By contrast, the adoption of measures that synthesise the two dimensions might help simplify policy-making's initiatives to tackle digital inequalities.

Contents

1. Introduction

The literature recognises a fundamental role of new technologies in both providing opportunities and facilitating people's everyday lives (Punie, 2007; Sefton-Green, *et al.*, 2009). This recognition has triggered a flourishing academic debate, firstly around the definition of digital access (Gonzales, 2016), and secondly around the definition of digital skills and competences (Litt, 2013) and potential inequalities in using the Internet connected to them (van Deursen and van Dijk, 2014). This paper adopts the model developed and empirically tested by Ragnedda, *et al.* (2019) based on the concept of digital capital (Ragnedda, 2018; Ragnedda and Ruiu, 2020) intended as a set of two main components represented by digital technologies (externalised resources) and digital competences (internalised aptitudes and abilities). The operationalisation and measurement of this specific capital, which combines both access and competencies, enables us to explore how it interacts with the different levels of digital divide, which unveil inequalities in Internet use and digital skills (the second level of the digital divide) and uneven capacities and opportunities to benefit from the online experience (the third level of the digital divide).

Based on a representative sample of the U.K. population (n = 868) this paper explores inequalities in using the Internet by investigating several digital activities that require different levels of digital capital. The focus on the second level of the digital divide (Hargittai, 2002) depends on the findings of a survey carried out by the U.K. Office for National Statistics (2018), which show that in 2018 around 90 percent of the population in the U.K. used the Internet. Hence, this suggests that the first level of digital divide (related to physical access to the Internet) appears to be overcome in the U.K., as well as in almost all global north countries. However, mere access to the Internet does not necessarily mean that digital inequalities are tackled (van Dijk, 2006). In contrast, since an increasing number of people access the Internet, there is a need to investigate how they use it in relation to their specific competencies, what type of online activities they take part in (de Hann, 2004; Shih and Venkatesh, 2004) and how these activities might be related to the main axes of inequalities (Robinson, *et al.*, 2015). In fact, it is increasingly important, both for policy-makers and scholars, to understand the range of activities a person can perform online, which abilities are required and how they can fully exploit the possibilities offered by the Internet.

1.1. Research question

By using a holistic variable (digital capital), which is comprehensive of multiple aspects related to both digital competences and digital access, this study aims to explore how levels of digital capital are related to the second level of the digital divide. Accordingly, this paper reports the results of multinomial logistic regressions aimed at investigating the relationship between digital capital and the types of activities users carry out on online. Therefore, this investigation provides an answer to the following overall research question:

Is the level of digital capital intertwined with differences in Internet use?

To bring to light meaningful insights into inequalities in Internet use and its relationship with digital capital, we will first briefly review the literature on the digital divide, by describing the theoretical background upon which the hypotheses that drive this work are constructed and then we will adopt a digital capital measure to explore its interaction with the type of Internet use. Finally, in the conclusion, we will highlight some of the limitations and implications of this study.

2. Theoretical background

The literature on digital inequalities has evolved over the years by focusing on the different levels of the digital divide (Ragnedda, 2017) to classify different types of access, level of digital skills and competencies (Eynon and Geniets, 2016) and related resulting benefits. More specifically, the first wave of research on digital inequalities mainly focused on physical access to the Internet by drawing a boundary between those who own digital

technologies and access the Internet and those who are excluded from the digital arena (Riggins and Dewan, 2005; Katz and Rice, 2002). These studies gradually evolved from exclusively focusing on Internet access towards considering the role played by socio-demographic, cultural and economic factors in influencing the digital divide (Korupp and Szydlik, 2005; Wasserman and Richmond-Abbott, 2005). Variables such as gender (DiMaggio, *et al.*, 2001), age (Loges and Joo-Young, 2001), racial background (Fairlie, 2004; Mesch and Talmud, 2011), education (Attewell, 2001), geographical location (Chen and Wellman, 2004; Chinn and Fairlie, 2007) and income (Witte and Mannon, 2010) have been used to investigate how the digital divide interacts with social inequalities. In fact, it soon became clear that access to ICTs in general, and the Internet in particular, did not guarantee neither the type nor the quality of use. New forms of inequalities connected to the type of Internet use were, therefore, classified as the second level of the digital divide (Hargittai, 2002). Accordingly, some scholars highlighted the necessity to further investigate the phenomenon of digital divide to capture the "usage gap" (van Dijk, 2004) and the role played by individual competences and skills that enhance and facilitate the Internet experience (Hargittai and Walejko, 2008; van Dijk, 2006).

Researchers pointed out how not only access but also the level of digital skills is influenced by several factors such as education (Correa, 2010; Hargittai and Hinnant, 2008); income (Duggan and Smith, 2013); location of access, age (Blank and Groselj, 2014) duration and intensity of use (Hargittai, 2002; Haight, *et al.*, 2014) and social support (Freese, *et al.*, 2006; Hassani, 2006). Specific types of Internet activities were found to produce more benefits than others because they increase individuals' resources and opportunities (van Deursen, *et al.*, 2017). From this, a shift towards a new level of digital divide developed which concerns the gap between advantages that users can get from the Internet. Therefore, the digital divide evolved towards a third level that includes the outcomes of the Internet experience in terms of returning benefits from its use (Ragnedda and Ruiu, 2020). These studies have underlined how different capitals and socio-demographic backgrounds not only influence the perception of ICTs (Kvasny, 2005), but also both access to and the quality and types of Internet usage. They also showed how access and use of the Internet mirror off-line inequalities (Witte and Mannon, 2010).

2.1. Digital capital

In the last few years, several researchers have repeatedly highlighted the necessity of introducing a new measure to capture and isolate the potential "digitality" of a new capital. However, even though several researchers have recognised the key role of the digital experience in enhancing social benefits and increasing other forms of capital, none of them isolated a specific capital (Morgan, 2010; Seale, *et al.*, 2006; Emmison and Frow, 1998). In contrast, the tendency is to incorporate both digital access and competences into other forms of capital (Prieur and Savage, 2013). Some scholars attempt to isolate this new capital such as in the case of "information capital" (Hamelink, 2000) and "techno-capital" (Rojas, *et al.*, 2004). Specifically, the concept of techno-capital and its further development (McConnell and Straubhaar, 2016) measures the capability of users to accomplish basic computer's tasks. However, these approaches while isolating a specific capital neither operationalize it nor focus on this capital as an holistic variable that include both access and competences.

This contribution fills this gap in the literature by focusing on the definition of digital capital provided by Ragnedda (2018) and further developed by Ragnedda and Ruiu (2020) as "the accumulation of digital competencies (information, communication, safety, content-creation and problem-solving), and digital technology". Echoing Bourdieu, digital capital is seen as "a set of internalised abilities and aptitudes" (digital competencies) as well as "externalised resources" (digital technology) that can be historically accumulated and transferred from one arena to another. This theoretical concept was operationalised and empirically applied by showing its capacity to capture the complexity of people's digital background/experience and competences (Ragnedda, *et al.*, 2019; Ragnedda and Ruiu, 2020).

The originality of this paper relies on advancing the study of class stratification by exploring the relationship between digital capital and inequalities in using the Internet. The application of Bourdieusian constructs to the study of digital inequalities is not novel in sociology. Exploring the application of the concept of field in digital sociology, Ignatow and Robinson (2017) argue that social fields are porous and social actors struggle to accumulate capitals to improve their position. In addition to the traditional forms of capital, nowadays digital capital might be considered as a vital ingredient to understand the new forms of digital-based class stratification. In fact, the traditional conceptualisation of capitals that operate within a fluid social field, which is in turn interiorised by its social actors, should be revised in the light of a digital segmentation.

The widespread use of ICTs and the evolution of digital divide shows that digital capital might have become a key concept in understanding the new forms of inequalities, especially in relation to its potential influence on digital stratification. It is important to understand how digital know-how, in addition to physical access to the Internet, creates favourable conditions for people to trigger a virtuous cycle. In such a virtuous cycle people might access and use the Internet to increase their digital capital and, therefore, facilitate their daily activities.

2.2. Research goals and hypotheses

This article shows how digital capital might contribute towards narrowing digital and social inequalities by enhancing new opportunities through different uses of the Internet. This is a first attempt to synthesise access and competence into a specific capital to analyse its relationship with the frequency/intensity of online activities. We are assuming that higher levels of digital capital increase the frequency of some online activities, such as social, economic/financial, learning, ordinary/daily, entertainment, and political activities, potentially generating new opportunities that could improve individuals' life chances.

Six hypotheses assume a relation between the level of digital capital and specific types of online activities, which fall into the social, economic/financial, learning, ordinary/daily, entertainment, and political macro-areas. More specifically, we expect the following positive relations:

H1: Digital capital is positively related to online activities with a social valence.

Our first hypothesis assumes that those with a higher level of digital capital are more likely to use the Internet for social activities. This hypothesis is based on those studies that outlined how different forms of access to and level of digital skills influence both the quality and frequency of activities in enhancing social capital (Chen, 2013; Hampton, *et al.*, 2011; Zhao, 2006). The literature on digital experience and social capital development (Neves, 2015, 2013; Pénard and Poussing, 2010; DiMaggio, *et al.*, 2004; Katz and Rice, 2002) shows that a higher Internet use is associated with increased participation in voluntary organisations (Filsinger, *et al.*, 2020; Wellman, *et al.*, 2001), with stronger off-line bonding ties (Williams, 2019) but also with enlargement of online social network (Li, *et al.*, 2018; Ragnedda and Ruiu, 2017; Williams, 2007, 2006). Therefore, this suggests that even if we conceptualise digital capital as the synthesis of both access and digital competence, the relationship between the use of ICTs and social outcomes should be kept positive.

H2: Digital capital is positively related to online activities with an economic/financial valence.

We suggest that those with a higher level of digital capital are more likely than others to carry on economy-enhancing activities. In other words, individuals with an advanced or proficient level of digital capital tend to use the Internet to increase their economic capital more than those who have an elementary and intermediate level. This is in line with several findings that underlined how economic online activities are related to digital skills and types of access (DiMaggio, *et al.*, 2004; Hargittai, 2010; Cheong, 2008; Peter and Valkenburg, 2006).

H3: Digital capital is positively related to online activities with a learning valence.

We hypothesise that users with higher levels of digital capital tend, more than others, to use the Internet for learning activities. This assumption is based on previous research that showed the positive impact of both computer ownership and access to the Internet (*e.g.*, Kirschner and Karpinski, 2010; Fairlie, *et al.*, 2010), and different uses of technologies (Fiorini, 2010; Junco, 2012) on learning activities.

H4: Digital capital is positively related to online activities connected to ordinary functions/daily life.

This hypothesis assumes that higher levels of digital capital provide practical support for everyday life. This is supported by the Ofcom (2018) report that found that Internet users in the U.K. go online for "ordinary activities" such as, for example, purchasing goods, services or tickets. Often, these online activities are part of individuals' routines and tend to influence daily life (Berker, *et al.*, 2006). Therefore, we assume that those individuals with higher levels of digital capital use ICTs to facilitate their everyday activities (Zillien and Hargittai, 2009) by incorporating them in their habit.

H5: Digital capital is positively related to online activities with an entertainment valence.

This hypothesis assumes that the higher digital capital, the more frequent the online activities related to entertainment are. However, this hypothesis will be also investigated by considering the potential interaction between digital capital and age on entertainment activities. In fact, as the Ofcom (2018) report shows, 36 percent of U.K. adults use several devices connected to the Internet for gaming. However, the frequency of use of these devices for gaming increases among younger adults (aged 16–34). This hypothesis is further supported by the fact that younger adults (aged 16–24 and 25–34) are more likely to use the Internet for streaming audio services and videos (Ofcom, 2018) and British Internet users with better digital skills are more likely to show "creative engagement" on the Internet, such as gaming (Helsper and Eynon, 2013).

H6: Digital capital is positively related to online activities with a political valence.

This hypothesis is connected to previous research that shows how, even though it is difficult to prove that online activism produces positive effects on off-line political engagement, specific online activities do influence forms of online political participation (Feezel, *et al.*, 2016). We therefore assume that those with a higher level of digital capital are more involved in online political activities than others.

3. Research method, sample and data collection

The overall research question guiding this work relates to the influence of digital capital on the types of online activities that users carry out online. The measure of digital capital adopted in this work is that developed by Ragnedda, *et al.* (2019) and measured through an online survey in the U.K. Table 1 shows the stratification of the sample by gender, age, and education.

Table 1: Description of sample.
Note: $n = 868$.

		Count	Percentage
Gender	Male	434	50
	Female	434	50
Age	18–24	94	11
	25–34	151	17
	35–44	141	16
	45–55	157	18
	55+	325	37
Education	Some high school, no diploma	94	11
	High school graduate	222	25
	Bachelor's degree	248	29
	Master's degree	68	8
	Doctorate degree	30	3

Differently from previous studies that focused on specific components of digital capital in relation to the second level of the digital divide, this research considers digital capital as a specific capital that simultaneously includes aspects related to both access and competencies/skills (see Figure 1). This helps investigate how this comprehensive index relates to the second level of the digital divide by exploring its connections with the type of activities that users (with a specific level of digital capital) carry out online.

Mainly drawing upon the results reported by the Ofcom related to the use of media by adults in the U.K., we identified six different macro-areas related to economic/financial activities, learning activities, social activities, entertainment activities, ordinary/everyday activities, and political activities (see Table 2). The frequency of different activities belonging to one of these groups was recorded through a set of questions (scaled from 1=never to 5=very frequently). Following the same approach adopted by Ragnedda, *et al.* (2019), we reduced the sets of questions through the means of confirmatory factor analysis by extracting a synthetic factor per each dimension (six in total).

3.1. Measures and analysis

We identified several sub-areas for each of the six different macro-areas. More specifically, the macro-area related to *social relationships* was investigated by considering the use of the Internet for i) developing new friendships; ii) using social media, and keeping in touch with both iii) friends; and, iv) family. These sub-areas of investigation were identified by referring to previous studies that show that the Internet may contribute towards developing close online relationships, which might move to face-face friendships (McKenna, *et al.*, 2002). These areas are also based on the literature on how the Internet contributes to making existing relationships more stable (Goodman-Deane, *et al.*, 2009).

In the case of *activities with economic/financial valence*, since the Ofcom reports (2018, 2016) show that younger adults are more likely to go online to look/apply for jobs; whereas older adults tend to use the Internet to find information for enhancing work/business (Ofcom, 2016), a measure based on combining these two separate questions was developed (see Table 2).

Online learning activities were measured by referring to the use of the Internet for both learning new things (such as new languages) (see also Ofcom, 2018) and studying.

The use of the Internet for *practical/ordinal activities* was measured by combining activities related to the i) purchase of products or services; ii) payment of bills; and, iii) making travel arrangements. This is also supported by the Ofcom (2018) report that found that Internet users in the U.K. go

online to purchase goods, services or tickets (50 percent of respondents in the last week) and for paying bills (30 percent).

Online entertainment was measured by including activities related to i) gaming; ii) downloading/listening to music; and, iii) watching movies. Accordingly, the Ofcom (2018) report shows that U.K. adults use several devices connected to the Internet for these leisure activities.

Finally, to measure those *activities with a political valence*, differently from Ofcom (2018), which investigates online activities related to keeping up with current events/politics, we also included activities related to taking part in political discussion.

The new six variables generated through confirmatory factor analysis were converted to a range from 0 to 100 and categorised as two levels (50 score-units each) that capture the frequency/intensity of the online activities related to each macro-area. The first level was labelled as "irregular activity" (sporadic/infrequent use of the Internet for a specific purpose); a second level was labelled as "regular activity" (recurrent/habitual use of the Internet for a specific purpose).

Table 2: Frequency of social, financial, learning, ordinary, entertainment and political activities.
Note: Six-point-scale: never (1); very rarely (2); rarely (3); occasionally (4); frequently (5); very frequently (6).

Macro area	Activities	Measure
Social	New friendships	Six-point scale
	Social media	
	Network with friends	
	Network with family	
Economic/financial	Job applications	Six-point scale
	Work/Business	
Learning	Learning of new things (new languages)	Six-point scale
	Study	
Ordinary	Products/services purchase	Six-point scale
	Bills	
	Travel arrangements	
Entertainment	Games	Six-point scale
	Music	
	Movies	
Political	Current events information	Six-point scale
	Political discussion	

Regarding the levels of digital capital, we referred to the measure proposed by Ragnedda, *et al.* (2019) that results from the combination of two indexes related to digital access and digital competence (see Figure 1). These two indexes were combined through a multiple-step factorial analysis that firstly synthesises the variables and dimensions included in each component (access and competence), and then the two components. The new scalar variable (digital capital) obtained through factor analysis was converted to a range from 0 to 100. The digital capital variable was then transformed into a categorical variable by splitting it into four groups (25 score-units each). A level of proficiency was attributed to each category. The four levels were labelled as "elementary" (scored 0–25); "intermediate" (scored 26–50), "advanced" (scored 51–75), and "proficient" (scored 76–100). This categorisation responds to the aim of this article that is investigating digital inequalities that cause digital stratification by looking at the interaction between different levels of digital capital ("elementary", "intermediate", "advanced", and "proficient") and the frequency of implementation of specific online activities.

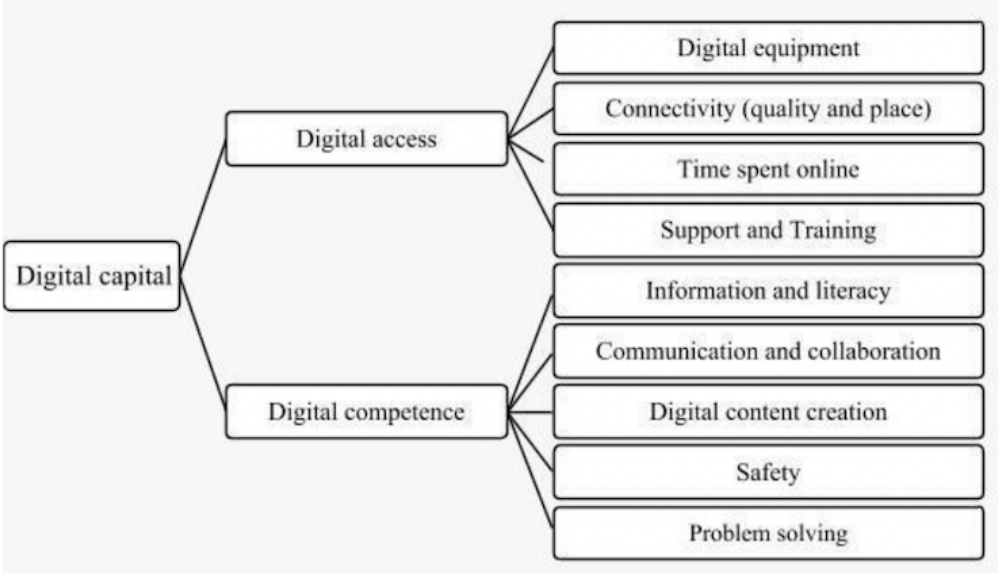

Figure 1: Levels of digital capital.

4. Results

Table 3 shows the loadings per each new variable related to the frequency/intensity of specific online activities, obtained through the means of factorial analyses. The new continuous variables were then transformed into a range from 0 to 100 to simplify interpretation. For digital capital, the values are those measured by Ragnedda, *et al.* (2019).

Table 3: Component loadings per each new component.
Note: Extraction Method: Principal Component Analysis.

Component	Activities	Loading
Social	New friendships	.556
	Social media	.892
	Network with friends	.837
	Network with family	.729
Economic/financial	Job applications	.860
	Work/Business	.860
Learning	Learning of new things (new languages)	.896
	Study	.896
Ordinary	Products/services purchase	.789
	Bills	.805
	Travel arrangements	.762
Entertainment	Games	.733
	Music	.856
	Movies	.866
Political	Current events information	.794
	Political discussion	.794

The new variables related to the type of online activities were used as dummy variables (split into two levels labelled as infrequent/irregular and frequent/habitual) in binary logistic regressions to explore the effects of the digital capital level on the frequency/intensity of activities with a specific purpose. As highlighted in the methodological section, the digital capital (independent variable) was used in the model as a four-level categorical variable (elementary, intermediate, advanced and proficient).

To explore the effects of the four levels of digital capital ("elementary", "intermediate", "advanced", and "proficient") on either regular or irregular implementation of social activities, a binary logistic regression was performed. The Hosmer and Lemeshow Test shows values higher than 0.05 (Table 4), hence the model fits the data. The model with all the predictors has an observed significance level of 0.000 (Table 4), which allows us to reject the null hypothesis that the model without predictors is as good as the model with predictors. The binary logistic regression indicates that digital capital is a significant predictor of online regular social activities. All four categories included in digital capital explain 20 percent of the variability of *regular social activities being practiced online*. The odds ratio (OR) for *elementary level of digital capital* is .066, for *intermediate* is .075, and for *advanced* is .242. These values suggest that as the level of digital capital increases, the odds of social activities being practiced online increase as well, the *proficient* level being the most likely category to be associated with regular social activities.

Table 4: Effect of level of digital capital on social activities.
Note: *p<0.001.

	B	S.E.	Odds ratio
Omnibus Tests of Model Coefficients: chi-square=111.191 (p=0.000); Hosmer and Lemeshow Test: .000 (p=1); Nagelkerke=.204			
Elementary	-2.715*	.852	.066
Intermediate	-2.595*	297	.075
Advanced	-1.418*	.198	.242
Proficient	Reference cat. *		
Constant	1.799*	.159	6.043

(Table 5 shows the result of a binary logistic regression with the four levels of digital capital as predictors of online economic/financial activities. As in the previous case, the ordinal category related to the *proficient* level of digital capital (reference category in the model) is also the most likely to be associated with regular economic/financial activities.

Table 5: Effect of level of digital capital online economic/financial activities. Note: *p<0.001.			
	B	**S.E.**	**Odds ratio**
Omnibus Tests of Model Coefficients: chi-square=111.980 (p=0.000); Hosmer and Lemeshow Test: .000 (p=1); Nagelkerke=.204			
Elementary	-2.715*	.852	.066
Intermediate	-2.595*	297	.075
Advanced	-1.418*	.198	.242
Proficient	Reference cat. *		
Constant	1.799*	.159	6.043

In analysing the effect of the level of digital capital on learning activities, the original model including only the four categories of digital capital resulted in explaining only nine percent of the variance. Adding gender as covariate did not improve the quality of the model, also showing significant values for the Hosmer and Lemeshow Test. The addition of the interaction between digital capital and age slightly improved the model by increasing the percentage explained and providing a better fit (see Table 6). The interaction of level of digital capital and age results were significant for both the *intermediate* and *advanced* levels compared to the *proficient*. This suggests that those who have either an *intermediate* or *advanced* level of digital capital are less likely, compared to those who are *proficient* users, to carry on learning activities as their age increases. In contrast, excluding this interaction, the odds of someone with either *intermediate* or *advanced* digital capital carrying on learning activities are higher than someone who is *proficient*.

Table 6: Effect of the interaction between level of digital capital and age on online learning activities. Note: *p<0.001.			
	B	**S.E.**	**Odds ratio**
Omnibus Tests of Model Coefficients: chi-square=75.884 (p=0.000); Hosmer and Lemeshow Test: 7.847 (p=.165); Nagelkerke=.165			
Elementary	-20.411	45858.213	.000
Intermediate	1.961	1.546	7.103
Advanced	1.493*	.497	4.452
Proficient	Reference cat. *		
Elementary by age	.000	803.400	1.000
Intermediate by age	-.079*	.034	.924
Advanced by age	-.052*	.011	.949
Proficient by age	Reference cat. *		
Constant by age	-.792*	.120	.453

Exploring the effect of digital capital on ordinary activities practiced online, Table 7 shows that proficient users are more likely to use the Internet to accomplish daily activities, such as buying products and services, paying bills and buying tickets.

Table 7: Effect of the interaction between level of digital capital and age on online ordinary activities. Note: *p<0.001.			
	B	**S.E.**	**Odds ratio**
Omnibus Tests of Model Coefficients: chi-square=56.009 (p=0.000); Hosmer and Lemeshow Test: .000 (p=1); Nagelkerke=.120			
Elementary	-3.871*	1.094	.021
Intermediate	-1.862*	.293	.155
Advanced	-.820*	.225	.440
Proficient	Reference cat. *		
Constant	2.079*	.177	.8.000

Table 8 shows the effect of digital capital on online entertainment activities, including the effect of age. The hypothesis is partially confirmed. In fact, as shown in Table 8 statistically significant differences exist only between *advanced* and *proficient* levels. However, the odds for *advanced* users using the Internet for entertainment are higher than *proficient* users. Considering the interaction with age, both *intermediate* and *advanced* users appear to be less likely to do entertainment activities as their age increases, compared to *proficient* users.

Table 8: Effect of the interaction between level of digital capital and age on online entertainment activities.

Note: *p<0.001; **p<0.05.			
	B	**S.E.**	**Odds ratio**
Omnibus Tests of Model Coefficients: chi-square=224.457 (p=0.000); Hosmer and Lemeshow Test: 1.992 (p=.850); Nagelkerke=.201			
Elementary	-51.306	23664,457	1914+22
Intermediate	1.254	1,242	3,505
Advanced	2.578*	.507	13,177
Proficient	Reference cat. *		
Elementary by age	-1.754	690.028	,173
Intermediate by age	-.069**	.023	,933
Advanced by age	-.082*	.010	,921
Proficient by age	Reference cat. *		
Constant by age	-.763*	.119	2.146

Finally, the effect of digital capital on political activities shows that *proficient* users are also more likely to use the Internet for activities with a political valence (see Table 9). Therefore, this hypothesis is also confirmed, since those with a higher level of digital capital are more likely to use the Internet for political activities, compared to those with lower levels.

Table 9: Effect of the interaction between level of digital capital and age on online political activities.
Note: *p<0.001; **p<0.05

	B	**S.E.**	**Odds ratio**
Omnibus Tests of Model Coefficients: chi-square=120.889 (p=0.000); Hosmer and Lemeshow Test: .000 (p=1); Nagelkerke=.209			
Elementary	-1.723*	.845	.179
Intermediate	-2.552**	.348	.078
Advanced	-1.470*	.171	.230
Proficient	Reference cat. *		
Constant	.806*	.120	2.240

5. Discussion

The article aimed to investigate the interaction between different levels of digital capital ("elementary", "intermediate", "advanced", and "proficient") and the frequency of implementation of specific online activities. The binary logistic regression, used to answer both the general question guiding this work and the related six hypotheses, made it possible to observe the co-evolution of both levels of digital capital and activities more frequently practiced by the Internet users. In this vein, this paper makes several contributions that clarify how the level of digital capital is intertwined with the type of online activities. More specifically, our data show that the level of digital capital is positively interrelated with the higher frequency of social, economic/financial, ordinary/daily, entertainment, and political activities, but not with learning-related activities.

Proceeding in an orderly manner, the following sub-sections specifically discuss each hypothesis.

5.1. Digital capital and online activities with a social valence

The first hypothesis related to the positive relationship between digital capital and online activities with a social valence is supported by the study. The digital capital level appears to be a significant predictor of online regular social activities by suggesting that as the level of digital capital increases, the odds of social activities practiced online increase as well. This finding is further supported by the literature (Pénard and Poussing, 2010; DiMaggio, *et al.*, 2004; Katz and Rice, 2002) that shows how the variety of devices from which users access the Internet (van Deursen and van Dijk, 2015) and different digital competences or skills (Lee, *et al.*, 2014) influence social interaction. However, this literature refers to access and competence as two independent aspects of the digital experience. In fact, a number of studies have shown how access to and use of the Internet are vital in enhancing social interaction (Ellison and Vitak, 2015; Ellison, *et al.*, 2014), both in terms of reaffirming frequent and reciprocal close ties within users networks (Jin, 2015; McEwan, 2013) and enlarging existing networks (Jin, 2015). This is important from a policy-making point of view considering, for example, that in the U.K. the use of the Internet for social networking increased by 15 percentage points between 2013 and 2019, whereas relationships with neighbours decreased (U.K. Office for National Statistics, 2020). These data suggest that the value and meaning of personal relationships and social network support should be revised in the light of the digital experience. Moreover, this also suggests that the nature and strength of relationships that emerge online might also be influenced by the individual digital capital. Therefore, policies that aim to reinforce social networks should simultaneously look at both access and competence of users. For example, during the COVID-19 worldwide pandemic, which forced people to stay home, the Ofcom (2020) launched a campaign to help broadband and mobile users stay connected. This campaign resulted from a concrete necessity to provide Internet connection to people that are forced by the crisis to work and relate to each other via the Internet. However, the advices provided by the Ofcom entirely relate to how facilitate the access to the Internet (*e.g.*, reducing the number of devices attached to home WIFI to increase Internet speed). Therefore, these advices are targeted to people who are supposed to be competent in using ICTs. Armitage and Nellums (2020), highlight that self-isolation especially affects those elderly individuals who rely on social contacts out of the home and have limited capacity to access ICTs. Therefore, both disparities in access to and literacy in using ICTs might cause inequalities and jeopardise government's attempts to protect those vulnerable categories who only possess an elementary level of digital capital.

5.2. Digital capital and online activities with an economic/financial valence

The second hypothesis, connected to the positive relationship between higher levels of digital capital and online activities with an economic/financial valence, appears to be supported. Indeed, proficient levels of digital capital are most likely associated with regular economic/financial activities. This further reinforces previous findings that show that different access to and capacity to use ICTs influence the types of Internet use in enhancing capital (Boonaert and Vettenburg, 2011; Sims, 2014). The so-called capital-enhancing activities (Zillien and Hargittai, 2009) link people, for instance, to the world of jobs and the economy (Blank and Groselj, 2015), improving their life chances in this area. In this vein, our research shows that having higher levels of digital capital increases the possibility of being involved in these economic/financial activities and, therefore, offers more chances to get the most out of the use of the Internet in this field. Considering the COVID-19 crisis and the aforementioned Ofcom campaign to help Internet users stay connected, one example could be that of a private piano teacher who has to deliver online lessons. The access to the Internet is only a part of the challenge. The success of this activity also depends on their digital creativity and capacity to successfully support and stimulate their alumni and make them progress. On the other side, students should be able to efficiently use the potentialities that specific types of apps can offer (*e.g.*, Skype, WhatsApp, and Zoom) to attend their online lessons. Therefore, those who possess the appropriate level of digital capital will be more likely to keep working efficiently. This is important from a policy-making point of view, also given U.K. government's effort to promote smart working that became government policy in July 2018 (U.K. Cabinet Office, 2018). Moreover, a policy paper by the U.K. Department for Digital, Culture, Media & Sport (2017), pointed to the need to promote "knowledge to make the most of the digital economy, whether at work or beyond". This paper also highlighted that many jobs have been increasingly requiring digital skills. Therefore, digital capital index might be useful in this sense to understand if the workforce is equipped with the digital background required by the digital economy.

5.3. Digital capital and online activities with a learning valence

The third hypothesis, related to an increase in the frequency of learning activities practiced online in correspondence to an increase of digital capital levels, seems to be partially supported if the effect of age is simultaneously considered in the model. In fact, with the increase of age, proficient users are more likely to carry on learning activities. In contrast, excluding this interaction, the fact that there is not a statistically significant difference between the lower levels of DC (*basic* and *intermediate*) and the *proficient* level, in terms of carrying on learning activities, might also depend on the tool used to investigate the problem. In fact, the questions included in the survey generally referred to "learning new things" and "studying", and this might have affected the responses. In contrast, the research conducted by Ofcom on adults use of media refers to specific online resources used to learn new things (such as educational Web sites and Google). This might also help explain the differences which emerged when including the effect of age. One would expect that older people tend to use the Internet less frequently for learning activities compared to younger adults. However, the interaction between increasing age and digital capital increases the differences between the lower and upper levels of digital capital in carrying on learning activities on the Internet, the oldest with higher digital capital being regular practitioners of learning activities, compared to the other categories. These results might be interesting for policy-making efforts aimed at promoting digital skills in schools, such as in the case of the Computing at School Network of Teaching Excellence in Computer Science (Computing at School (CAS), 2012). Referring to the example of COVID-19 crisis, children and teachers have been suddenly forced to move their school activities on online platforms. Even though they might have access to the Internet, it is not obvious that they would be able to use the ICTs in the best way possible, and this might affect the learning outcomes. The habit and attitude of younger people to use ICTs in the context of learning should be considered when producing framework aimed at increasing digital skills of both students and teachers, such as in the case of the CAS.

5.4. Digital capital and online activities connected to ordinary functions/daily life

The fourth hypothesis, related to the contribution of digital capital towards providing practical support for everyday life, is supported showing that *proficient* users are more likely, compared to other types of users, to use the Internet for daily activities, such as buying products and services, paying bills and buying tickets. This finding is consistent with previous research that underlined how different forms of access and digital skills influence both frequency and breadth of actions (Correa, 2010) also in the daily activities (Zickuhr and Smith, 2012). Moreover, these findings are also useful in the context of developing national standards for essential digital skills, as promoted by the government. In fact, basic skills that should be guaranteed by services aimed at promoting digital learning, include the use of online services and buying securely online. This also means developing the capacity to compare online buying options and identify best option (U.K. Department for Education, 2019).

5.5. Digital capital and online activities with an entertainment valence

The fifth hypothesis assumed that increases in digital capital also correspond to an increase in the frequency of entertainment activities practiced online. This is partially supported. In fact, statistically significant differences were found only between *advanced* and *proficient* levels, the *advanced* users being more likely to use the Internet for entertainment than *proficient* users. However, when considering the interaction with age, older *proficient* users are more likely than both *intermediate* and *advanced* users to search for entertainment online. This is in line with the literature that highlights a relationship between the use of the Internet for entertainment or creative activities and younger age (Anduiza, Cantijoch, and Gallego, 2009; Hargittai and Walejko 2008).

5.6. Digital capital and online activities with a political valence

The sixth hypothesis, related to the simultaneous increase of both digital capital and frequency of political activity online, is supported. This result slightly differs from mainstream findings, which show how younger people are less likely to be politically active (Shah, *et al.*, 2005; Büchi and Vogler, 2017). In contrast, the age interaction shows a positive effect of Internet use in reducing inequalities in terms of political involvement (Krueger, 2006; Delli Carpini, 2000). However, it must be noted that the initial model also included interaction with age. Differently from some previous studies, which show how young people tend to participate least in political activities (Shah, *et al.*, 2005), when the interaction with the level of DC is considered, this unequal use does not show statistically significant effects. However, this might be explained by a positive effect of Internet use in reducing inequalities in terms of political involvement (Krueger, 2006; Delli Carpini, 2000). Referring to the example of the coronavirus outbreak, the use of ICTs has become important in this worldwide crisis both to access information on the continuous evolution of the phenomenon and the related measures established by the government, and to keep up with the political debate at the global level. Therefore, from a policy-making point of view, the promotion of digital capital can also help keep people informed and involve them in political discussions.

6. Limitations and future research

Overall, this research supports the idea that the level of digital capital is positively intertwined with the frequency/intensity of social, economic/financial, ordinary/daily, entertainment, and political activities. However, surprisingly, the level of digital capital is not significantly related to online learning-related activities. Thus, in general, those who have a higher level of digital capital are not more likely than others to engage with online learning-related activities.

There are several limitations to this study that should be noted. Evidently the results are shaped by the operational definition of 'Internet use' we provided. Many more variables and typologies of use could have been included in the empirical research.

Furthermore, confirmative research is necessary to reveal whether these hypotheses, tested and verified with a representative sample of the U.K. population, are replicable in other sociocultural contexts. Future studies should, therefore, investigate the relationship (if any) between digital capital and Internet use in the context of lower Internet penetration to analyse this interrelationship, but also to compare and contrast the results with the ones obtained in the U.K. Finally, this work should be expanded using additional techniques. For instance, qualitative research based on in-depth interviews

with individuals with different level of digital capital should be carried out to understand how level of digital capital influences the outcomes of using the Internet.

7. Implications and conclusions

Overall, this study found that digital capital interacts with the frequency/intensity of several online activities that are frequent among U.K. users. These activities were then explored in relation to the level of digital capital to identify potential interconnections. Differently from previous studies that investigated specific aspects of the digital experience in relation to the second level of the digital divide, we adopted a comprehensive measure of digital capital and tested its reliability in relation to those variables that have already been identified as contributing towards producing inequalities. Therefore, this work contributes to the literature in both empirical and theoretical terms by testing the reliability of digital capital, and expanding the use of the digital capital concept to investigate digital inequalities

Throughout the paper we highlighted how the frequency of social, economic/financial, ordinary/daily, entertainment, and political activities are all positively related to an increase in digital capital. This shows that those who have a higher level of digital capital are more likely to engage with these online activities. The main contribution of this work is to show how an individual's level of digital capital is interrelated with the frequency of certain types of online activities, thus reinforcing the second level of the digital divide.

Furthermore, measuring and considering the level of digital capital can help policy-making. In fact, digital capital should be interpreted as an integral part of that network of interrelationships (Ignatow and Robinson, 2017), or field to use Bourdieusian words, that determines social positions. In this vein, for policy-makers it can be beneficial to know citizens' level of digital capital to monitor citizens' digital competencies and access. Knowing citizens' level of digital capital may help policy-makers to tailor initiatives to support citizens in using ICTs on a wide array of fields, such as job seeking, sociability, savings, family relationships, and other online activities that we have underlined. Moreover, the use of DC as specific capital can simplify the understanding of specific socioeconomic contexts. This means considering digital capital, among other indicators such as social, economic, political, cultural, and personal capital, as integral to the process of understanding social inequalities. In this sense, DC should be used as a simplified tool to support policy-making in narrowing/closing social gaps. The DC might be valuable also for evaluating existing initiatives promoted by the government, such as the case of 'Future digital inclusion' (aimed at engaging digitally-excluded people; see Good Things Foundation, 2017) and 'Widening digital participation' (aimed at promoting the use of NHS online services; see Good Things Foundation, 2020). These initiatives are valuable for promoting basic skills, however they work more on facilitating access to essential skills rather than developing proficient skills. In fact, looking at the data on basic digital skills in the U.K. (Ipsos Mori, 2018) 79 percent of the adult population possess basic digital skills. In conclusion, the results of this study underscore the role of digital capital as an indicator of larger social, economic, personal, and cultural inequalities found across society and that digital stratification needs more attention for fighting social exclusion.

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Acknowledgements

The authors received financial support for the research from British Academy SRG18R1\180983.

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Editorial history

Received 6 June 2020; accepted 9 June 2020.

Digital capital and online activities: An empirical analysis of the second level of digital divide
by Maria Laura Ruiu and Massimo Ragnedda.
First Monday, Volume 25, Number 7 - 6 July 2020
https://firstmonday.org/ojs/index.php/fm/article/download/10855/9568
doi: http://dx.doi.org/10.5210/fm.v25i7.10855